

U.S. Department of Energy

Initial Plan for the Conversion of Depleted Uranium Hexafluoride

As Required by Public Law 105-204



**Office of Nuclear Energy, Science and Technology
U.S. Department of Energy**

Initial Plan for the Conversion of Depleted Uranium Hexafluoride

Executive Summary

One of the more significant legacies left with the Department of Energy after the privatization of the United States Enrichment Corporation (USEC) is the large inventory of depleted uranium hexafluoride (DUF_6) located at the three gaseous diffusion plant sites. Some 700,000 metric tons of DUF_6 is being stored at the Paducah site in Kentucky, the Portsmouth site in Ohio, and the East Tennessee Technology Park (ETTP) in Tennessee.

This material is a stable but toxic, granular solid, much of which has been stored for long periods. The advanced age of some of the steel cylinders in which the DUF_6 is contained, and the way in which the cylinders were originally arranged (sometimes too close together to permit inspection, and sometimes in direct contact with the ground leading to cylinder corrosion) has created a potential environmental and safety hazard. This was underscored by Defense Nuclear Safety Board (DNFSB) Recommendation 95-1 which recommended that the Department improve storage and maintenance of the DUF_6 cylinders. While DUF_6 is not as significant a radiological threat as other isotopes, it is a chemical hazard.

In recent years, the Department, the DNFSB, State environmental agencies, and the public have become sensitized to the need for better management of these approximately 57,700 cylinders (approximately 37,000 are in Kentucky, 16,000 in Ohio, and 4,700 in Tennessee).

Since 1990, the Department has conducted a focused program of cylinder inspections, recoatings, and relocations to assure that DUF_6 is safely contained until the Department arranges for

its disposition. This plan recognizes that this important work is the responsibility of the Federal Government and that it must continue until all the DUF_6 is properly dispositioned.

The current program has largely focused on the ongoing maintenance of the cylinders containing DUF_6 . The question, however, of the long-term management and eventual disposition of DUF_6 is the subject of a Programmatic Environmental Impact Statement and considerable debate in Congress. The Department will issue a final Programmatic Environmental Impact Statement shortly, followed by a Record of Decision concerning the Department's decision on the long term management and use of DUF_6 .

Congress stated its intentions with regard to DUF_6 in Public Law (P.L.) 105-204, signed by the President in July 1998 (See Appendix A). This law directed the Secretary of Energy to prepare and submit to Congress a plan (herein referred to as the "Plan") to ensure that all funds accrued on the books of USEC for the disposition of DUF_6 will be used for the construction and operation of plants to treat and recycle the DUF_6 consistent with the National Environmental Policy Act. Approximately \$373 million was accrued by USEC for this purpose.

"Treat and recycle," in this context, refers to the chemical processing of DUF_6 to remove the fluorine and create products that would present both a lower long-term storage hazard and provide a material that would be suitable for use or disposal. Importantly, this would also allow the private and government sectors to explore the reuse of some of the end products resulting from

the conversion of DUF₆. Important examples include the potential use of depleted uranium oxide in various spent fuel storage and disposal methodologies and the reuse of the fluorine removed from the DUF₆ by the nuclear fuel industry. While these applications must still be explored, they present the possibility that some of the relatively high cost of disposition of DUF₆, as much as \$2.6 billion for the most expensive methods, could be offset to the benefit of the American taxpayer. These applications could also provide long-term benefits to the communities that have hosted the Nation's uranium enrichment facilities for so many decades by turning the large inventory of DUF₆ into a resource that could be used to spur new industrial activity.

The first step for future use or disposition is to convert the material. To do so, construction and long-term operation of one or more conversion plants is essential. The Department is considering a variety of activities including the construction of facilities ranging from demonstration size plants to full-scale conversion plants. Conversion, therefore, is the centerpiece of an integrated approach to eliminate or reduce the long-term liability to the Federal government for up-keep of the DUF₆ inventory. An integrated approach would encompass all or most of the following elements: cylinder surveillance and maintenance; the design, construction, operation, and final decommissioning of conversion facilities; storage or use of conversion end products; and disposition of end products not used -- uranium and fluorine compounds, and empty storage cylinders.

The Department believes that the private sector, rather than the Government, may be better able to provide an integrated approach for the management of the Department's DUF₆ inventory. The Department, for its part, would expect contracts under negotiated terms and with prices sufficient to compensate private companies to carry out the required construction and operation of the plants. In addition, the Department is considering near-term demonstrations during

calendar year 1999. The Department requires that any such demonstrations be cost-effective and able to provide substantive information that will benefit the overall program.

This is the Initial Plan. On March 4, 1999, the Department issued a request for expressions of interest (EOI) on the disposition of the Department's DUF₆ inventory. The responses to the EOI will provide information to develop the Department's detailed procurement strategy for an integrated approach to the management of the Department's DUF₆ inventory. A Final Plan, incorporating detailed information from the private sector, and ideas from affected members of the local communities, Congress, and other stakeholders, and providing a detailed schedule will be issued in May 1999. Once the Final Plan is issued, the Department recognizes that some aspects of this approach will evolve as its interactions with the private sector and stakeholders continue.

Because of the high cost of transporting large quantities of DUF₆, safety questions and State regulatory issues, the DUF₆ conversion will likely take place at or in the vicinity of the Paducah and Portsmouth plant sites. A base assumption made by this Plan is that the relatively small quantity of material in storage at the ETTP will eventually be relocated for disposition.

This Plan is based on an aggressive schedule to begin construction of conversion facilities in 2002, and relies on significant private sector involvement to be successful. The Department also looks forward to close coordination with affected State and local governments, communities, stakeholders, and interested Congressional delegations as this program completes its planning phase and moves toward implementation.

U.S. Department of Energy

Initial Plan for the Conversion of Depleted Uranium Hexafluoride

INTRODUCTION

The Department of Energy has established a Plan, pursuant to P.L. 105-204 (see Appendix A), for the construction of plants to convert its large inventory of the depleted uranium hexafluoride (DUF₆). This is the Initial Plan. On March 4, 1999, the Department issued a request for expressions of interest (EOI) on the disposition of the Department's DUF₆ inventory. The responses to the EOI will likely provide information to develop the Department's detailed procurement strategy for an integrated approach to the management of the Department's DUF₆ inventory. A Final Plan, incorporating detailed information from the private sector, and ideas from affected members of the local communities, Congress, and other stakeholders, and providing a detailed schedule will be issued later this year. Once the Final Plan is issued, the Department recognizes that some aspects of this approach will evolve as its interactions with the private sector and stakeholders continue.

While P.L. 105-204 focuses on the construction of plants to convert DUF₆, the Department has considered the management of DUF₆ in an integrated fashion, considering all aspects of DUF₆ management. Management of the Department's DUF₆ inventory involves the following elements: cylinder surveillance and maintenance; the design, construction, operation, and final decommissioning of conversion facilities; storage or use of conversion end products; and disposition of end products not used -- uranium and fluorine compounds and empty storage cylinders. This Initial Plan, therefore, covers three primary aspects of this management challenge:

Public Law 105-204 requires:

..The Secretary of Energy shall prepare, and the President shall include in the budget request for fiscal year 2000, a plan and proposed legislation to ensure that all amounts accrued on the books of the United States Enrichment Corporation for the disposition of depleted uranium hexafluoride will be used to commence construction of, not later than January 31, 2004, and to operate, an onsite facility at each of the gaseous diffusion plants at Paducah, Kentucky, and Portsmouth, Ohio, to treat and recycle depleted uranium hexafluoride consistent with the National Environmental Policy Act....

- the continued inspection and maintenance of the Department's 57,700 DUF₆ cylinders located in Kentucky, Ohio, and Tennessee;
- the establishment of the capability to convert (*i.e.*, convert the material from uranium hexafluoride to an oxide for long-term storage and disposal or reuse) the DUF₆ owned by the Department;
- the support for near-term demonstration and technology activities, including the development of a roadmap for government uses for components of the DUF₆.

This Initial Plan presents an integrated approach to address these challenges. Execution of this Plan would require future appropriations to the Department for its ongoing DUF₆ program, and funds obtained from USEC for the management of its material.

Even if the funds identified by P.L. 105-204 were made available to the Department, they would not be sufficient to construct facilities and convert all the DUF₆ for which the Department is responsible.

A key Departmental objective is to fully integrate all elements of managing the Department's DUF₆ inventory into a single contracting arrangement. Private industry would be responsible for design, construction, and operation of the conversion facilities, and decommissioning of the plants.

In order to try to reduce the cost for the management and conversion of its DUF₆ inventory, the Department plans to carry out some technology research and development to find government uses for products that can be derived from the DUF₆. Finally, until the inventory is completely converted, the Department's cylinder management program must continue.

Background

The Department of Energy's stockpile of DUF₆ is stored at the sites of the two gaseous diffusion plants located at Paducah, Kentucky and Portsmouth, Ohio, and at the East Tennessee Technology Park (ETTP) in Oak Ridge,

Tennessee. The Department's current and expected inventory consists of approximately 700,000 metric tons of DUF₆ that the government has accumulated from uranium enrichment operations since approximately 1945 and includes 145,000 metric tons of DUF₆ that has or will be generated by USEC.

In 1994, the Department began working on the draft *Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride* (PEIS)¹. The draft PEIS and supporting documents were published in December 1997.



A Typical Cylinder Storage Yard

The draft PEIS included a "no-action" alternative and several additional alternatives for the long-term management of the DUF₆ stockpile. These additional alternatives included: long-term storage as DUF₆ at a new site(s), conversion of the DUF₆ and long-term storage as an oxide, conversion of the DUF₆ to an oxide for use as

radiation shielding, conversion of the DUF₆ to uranium metal for use as radiation shielding, and conversion of the DUF₆ to an oxide for disposal. The preferred alternative in the draft PEIS was to convert all of the inventory when uses for the conversion products have been identified.

Engineering analyses and cost analyses for each of these alternatives were also prepared and published in final form with the draft PEIS. The projected costs of the alternatives were presented in the PEIS in 1996 dollars and were developed in the *Cost Analysis Report for the Long-Term Management of Depleted Uranium Hexafluoride*. The costs ranged from approximately \$327 million (in 1996 dollars) for continued storage of the

DUF₆ at the three sites, to as much as \$2.6 billion (in 1996 dollars) for the most expensive methods of conversion and disposal². These projected costs extended over a forty-year period, but the issue of storage beyond that period was not addressed. Included in the storage alternative were corrective actions required to address the results of poor DUF₆ cylinder storage practices. Due to the large quantity of DUF₆ cylinders in storage, continued (but steadily decreasing) cylinder maintenance actions were anticipated for DUF₆ cylinder storage during conversion activities.

The Department held four public meetings in February and March 1998. Based on the comments received at the meetings and other discussions with stakeholders, the preference of the public and involved industry is not to wait for uses to be developed, but rather to begin conversion of the DUF₆ promptly.



Cylinder Handling Machine at Work

In addition, since April 1997 the Department has held meetings and discussions with industry to identify cost effective management solutions. These meetings and discussions have suggested new uses for uranium oxide or depleted uranium metal materials and several companies have expressed interest in providing conversion services.

This interest on the part of industry coupled with the proposed use of funds accrued by USEC per P.L. 105-204, has prompted the Department to revise some of the assumptions used in the preparation of the draft PEIS and to reevaluate the most cost effective means for managing the

DUF₆ inventory.

The Department plans to issue its final PEIS identifying a preferred alternative for long-term management of its DUF₆ and the Record of Decision (ROD) in the Spring of 1999.

PLAN ELEMENT ONE: CYLINDER MANAGEMENT

Overview

The first element of the integrated Plan is to continue to maintain the DUF_6 inventory to assure safe storage in accordance with the *UF₆ Cylinder Program Management Plan*³ as appended to the Ohio Amended Consent Decree and the Tennessee Department of Environment and Conservation Agreement. Cylinder management involves the general maintenance and monitoring of the cylinders, including such activities as the construction and repair of cylinder storage yards, and the control of cylinder corrosion by surface cleaning and painting.

The Inventory

The Department owns approximately 700,000 metric tons of DUF_6 at the Paducah site in Kentucky, the Portsmouth site in Ohio, and the ETTP in Oak Ridge, Tennessee (see Table 1).

This inventory is the result of over 40 years of uranium enrichment activities by the Federal Government. Most of the uranium enrichment

activities conducted by the United States from the 1940's through the 1960's was performed to create highly-enriched uranium (HEU) for defense purposes. Most of the oldest cylinders in the inventory (generally located at the ETTP) are associated with defense materials production.

Since the mid-1960's the Federal enrichment enterprise began to devote its production to primarily commercial customers—utilities that would ship “natural” uranium hexafluoride to the Department for “toll” enrichment services. After enrichment, these commercial customers received low-enriched uranium hexafluoride, leaving the Department with the associated depleted uranium hexafluoride.

These operations continued through mid-1993, at which time Congress established the U.S. Enrichment Corporation (USEC). The Department was left with the responsibility to deal with all the DUF_6 created up to that point. Subsequent law clarified that the Department would be responsible for all the material produced by USEC after its formation and up to its privatization in 1998 (9,186 cylinders).

TABLE 1: LOCATION of DOE DUF_6				
Location	Original DOE Cylinders	Cylinders From USEC	Total Cylinders	Total DUF_6 (metric tons)
Paducah, Kentucky	28,351	8,559	36,910	450,000
Portsmouth, Ohio	13,388	2,653	16,041	198,000
Oak Ridge, Tennessee	4,683	0	4,683	56,000
TOTAL	46,422	11,212	57,634	704,000

Initial Plan for the Conversion of Depleted Uranium Hexafluoride

In addition, prior to privatization USEC paid the Department to take additional quantities of its DUF_6 . Thus, the Department agreed to take ownership of an additional 2,026 cylinders generated by the privatized USEC, which will be delivered over the next six years.

The Department received in FY 1998 \$66 million from USEC for the management and disposition of the 11,212 USEC-generated depleted uranium cylinders. The FY 1999 Energy and Water Development Appropriations Act requested an accounting of how the Department intended to apply the \$66 million received from USEC. The Department submitted its plan on December 17, 1998. The USEC funds are administered in accordance with the terms of Memoranda of Agreements (MOAs) and related correspondence between the Department and USEC regarding activities required to accept and maintain the USEC material.

Ongoing Site Activities

The day-to-day management of the cylinders includes actions designed to cost effectively improve the storage condition of cylinders. This work includes:

- building new concrete cylinder storage yards to provide a suitable platform for long-term storage (cylinders allowed to rest on the ground tend to corrode faster);
- repainting cylinders to arrest corrosion;
- restacking cylinders to improve drainage and enable inspections; and

Cylinder Management

- inspecting cylinders to assure no degradation of their condition.

The Department recognizes that it will take decades to convert all of the DUF_6 in the inventory. As a result, the long-term management of existing cylinders, the management of any future cylinders added to the inventory from USEC operations, and the continual effort to remediate and maintain the safe condition of the cylinders will remain a Departmental responsibility for many years into the future. As such, the Department is determined to abide by all relevant Federal and State regulatory requirements and to keep all applicable commitments (such as those with the

DNFSB, and the States of Ohio and Tennessee) associated with the environmental safety of the inventory.

In addition, the Department will configure its inventory to:

- assure effective conversion operations that minimize the handling and transport of the cylinders;
- facilitate experimentation and demonstration with inventory material; and
- develop and foster potential industrial activity that employs DUF_6 -derived materials.



Paducah Gaseous Diffusion Plant

PLAN ELEMENT TWO: CONVERSION

The second, and most important, component of this integrated Plan deals with the Department's effort to establish a DUF₆ conversion capability. Traditionally, a project like this might be the subject of a multi-year Federal government-managed project to build one or two plants. However, such projects require a significant outlay of Federal funds early on and require many years to complete. In comparison, the private sector is well-equipped to pursue plant projects expeditiously and economically as needed for the DUF₆ program. The Department believes that the private sector can and will be willing to take on the primary responsibility for designing, constructing, and operating the needed conversion plants.

Specifically, the Department believes:

- the private sector, rather than the Government, may be better able to design, build, operate, and manage anticipated DUF₆ plants;
- the private sector can complete the plants expeditiously, apply the most cost-effective technologies and methods, and develop private sector uses for DUF₆ to minimize the Government's costs; and
- the Government should explore arrangements with the private sector to make it economically attractive to make the investments required to carry out the program's objectives and develop government uses for DUF₆.

To implement these decisions, the Department's Plan includes an aggressive schedule of activities to enable the execution of conversion contracts in approximately one year, should the Department receive a suitable proposal. This schedule is shown on Table 2.

Procurement Approach

The Department plans to engage the private sector in a series of interactive activities focused on the issuance of a Request for Proposals (RFP) from the Department to the private sector for an integrated solution approach for DUF₆ for conversion and disposition. The Department will remain flexible in order to consider comments and input from industry and the public.

The first step in the procurement approach has been taken. On March 4, 1999, the Department issued a *Request for Expressions of Interest for a Depleted Uranium Hexafluoride Integrated Solution Conversion Contract and Near-Term Demonstrations (EOI)* (See Appendix B for copy of the EOI). Responses to this request will enable the Department to gauge industry interest in this activity, and learn about innovative approaches industry might suggest to carry out this program. Creative procurement approaches may be identified and implemented as long as they can reduce costs to the Department and guarantee that the inventory is converted. This EOI also addresses the potential advantages of near-term demonstrations; this component of the program is discussed under *Plan Element Three*.

TABLE 2: FULL-SCALE DUF ₆ CONVERSION CAPABILITY SCHEDULE AND KEY MILESTONES	
<i>Approximate Dates Subject to Procurement Strategy</i>	<i>Key Milestone</i>
First Quarter 1999	<ul style="list-style-type: none"> – Issue a request for Expressions of Interest (EOI) – Complete and issue the final PEIS
Second Quarter 1999	<ul style="list-style-type: none"> – Receive EOI responses – Issue the PEIS Record of Decision – Develop detailed procurement strategy – Issue draft Request for Proposals (RFP) for conversion contract – Hold conversion contract pre-proposal conference – Receive comments on draft RFP
Third Quarter 1999	<ul style="list-style-type: none"> – Issue final RFP for conversion contracts – Receive proposals
Fourth Quarter 1999	– Evaluate proposals
2000	– Award DUF ₆ conversion contract(s)
2002	– Complete design, and start construction of full-scale facilities

Next, based on the responses to the EOI, the Department will issue a final version of this Plan and establish a detailed procurement strategy which would include the issuance of draft and final requests for proposals and contract award(s) in time to support start of facility construction in 2002.

The Department's goal for this procurement will be to establish privately-financed conversion services capabilities at or proximate to the gaseous diffusion plant sites that can convert DUF₆ in a cost-effective manner. Conversion activities include material conversion, conversion product storage, and the cost of the subsequent disposal of any conversion products found to be unmarketable or not useable in other government applications. The box on the following page provides the key elements of the postulated contract.

Key Assumptions

In implementing this procurement approach, the Department makes the following assumptions:

- Execution of this Plan will require additional appropriations and/or alternative funding approaches in FY 2001 and beyond for the conversion activities.
- P.L. 105-204 calls for plants at the two major sites in Kentucky and Ohio; however, the Department is open to alternative proposals from industry which might save additional costs.
- The DUF₆ inventory at the ETTP will be moved as soon as practical and consistent with the requirements of state regulatory authorities.

- Contractual activity pursuant to this program will be indemnified under the Price-Anderson Act.

***Key Elements of the Integrated Solution
Conversion Contract***

- Awardee must strive for lowest system and life-cycle cost compatible with environmental, worker, and public safety.
- Overall cost to the government for conversion services will be a major criteria in the contract award.
- Awardee would begin construction of conversion plants located on or proximate to the Paducah and/or Portsmouth sites no later than January 31, 2004.
- The awardee would be solely responsible for facility clean-up costs and the only reimbursement the awardee shall receive from the Government will be the fee for conversion services.
- Earnings made from the sale or use of DUF_6 -derived materials must be used to offset annual costs to the Government.

PLAN ELEMENT THREE: NEAR-TERM DEMONSTRATIONS AND TECHNOLOGY ACTIVITIES

The final element of this integrated Plan focuses on the Department's intent to carry out 1) near-term demonstrations and 2) technology activities to reduce the overall costs of the DUF₆ program.

Near-Term Demonstrations

The Department plans to evaluate conducting near-term demonstration activities at the Paducah and Portsmouth sites to investigate conversion technologies and approaches that may benefit the DUF₆ program. The private sector has already generated several, potentially valuable concepts that could highlight important technical approaches to the conversion of DUF₆. Some of these approaches would involve the construction of new demonstration facilities while others would require the refurbishment of existing facilities and equipment already in place. The Department will evaluate any such concept so long as it is consistent with the primary goals of the program. The Department will evaluate proposals for near-term demonstrations based on cost-effectiveness and benefit to the overall program. In addition, timeliness is very important for this component of the program. The Department will insist that any near-term demonstrations be able to be quickly initiated.

The final version of this Plan will reflect the information garnered from the private sector in the *Request for Expressions of Interest for an Depleted Uranium Hexafluoride Integrated Solution Conversion Contract and Near-Term Demonstrations* (copy provided in Appendix B).

Technology Activities

In recent years the Department has gained valuable insight from industry about using materials derived from DUF₆ in various industrial processes. There are important barriers to many possible applications—such as regulatory uncertainties related to *de minimis* levels of radioactivity. But many potential applications hold considerable promise in the nuclear industry and to other Government programs. For example, the potential use of depleted uranium oxide derived from the DUF₆ to make DUCRETE™ (a concrete material containing depleted uranium) may provide significant benefits as a tool in the management and storage of spent nuclear fuel. Another potential nuclear industry application is the reuse of fluorine derived from the DUF₆ in the nuclear fuel industry. While these applications are unlikely to use all of the material available, they hold the potential for making a significant impact on the overall cost of this program, and the cost of Department's programs as a whole. The Department has proposed, in its FY 2000 budget request, funding for technology activities that will develop the application of DUF₆-derived materials to governmental programs.

The Department will develop a *DUF₆ Materials Use Roadmap* to establish a corporate plan for the application of DUF₆ and DUF₆-derived materials that will focus on potential governmental uses of DUF₆, but also incorporate limited analysis of established uses of DUF₆-derived materials in the nuclear industry. The Department expects to complete this roadmap before the end of FY 1999.

INTEGRATION AND IMPLEMENTATION ISSUES

The first step in the use or disposition of DUF_6 must be to convert the material. To do so, construction and long-term operation of one or more conversion plants is essential. The Department is considering a variety of activities including the construction of facilities ranging from demonstration size plants to full-scale conversion plants. Conversion, therefore, is the centerpiece of an integrated solution approach to eliminate or reduce the long-term liability to the Federal Government to maintain the DUF_6 inventory. An integrated solution approach would encompass the three DUF_6 program elements: cylinder management; conversion; and near-term demonstration and technology activities.

The three elements, implemented together, maximize the chances that the inventory will be managed safely and efficiently, and converted promptly at the lowest achievable cost to the government.

Program Authorities and Requirements

Additional funding would be needed. The Department does not believe that any other additional legislation is necessary at this time. The Department will continue to consider whether additional legislation is necessary or advisable in light of future developments in the program.

CONCLUSION

The Department is committed to the successful implementation of a program to convert its voluminous inventories of DUF_6 . These inventories have been maintained in their current form because the Department and its predecessor agencies believe that these materials represent an asset to the Nation.

Conversion of the Department's DUF_6 would represent a major new undertaking that may span several decades and involve a significant investment of resources. This program would require a significant commitment and investment for the Department that demands careful planning, skillful execution, and good communications with stakeholders. This Plan provides a roadmap for such a program. Decisions regarding the funding necessary to execute this Plan will be made in the course of the normal budget process.

This Plan is based on an aggressive schedule to begin construction of conversion facilities as early as 2002, and relies on significant private sector involvement to be successful. The Department believes that this schedule can be achieved and looks forward to close coordination with affected State and local communities, stakeholders, and interested Congressional delegations as this program completes its planning phase and moves toward implementation.

*Initial Plan for the Conversion of
Depleted Uranium Hexafluoride*

END NOTES

1. DOE/EIS-0269, *Draft Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and use of Depleted Uranium Hexafluoride*, U.S. Department of Energy, December 1997.
2. Table 5.1 and 5.2, UCRL-ID-127650, *Cost Analysis Report for the Long-Term Management of Depleted Uranium Hexafluoride*, Lawrence Livermore National Laboratory, May 1997.
3. Lockheed Martin Energy Systems, Inc., 1997, *UF₆ Cylinder Program Management Plan*, K/TSO-30, Rev. 2, prepared by the Project Support Organization, East Tennessee Technology Park, Oak Ridge, TN, for the U.S. Department of Energy, July.

Appendix A

PUBLIC LAW 105-204
[[Page 112 STAT. 681]]
105th Congress

An Act

To require the Secretary of Energy to submit to Congress a plan to ensure that all amounts accrued on the books of the United States Enrichment Corporation for the disposition of depleted uranium hexafluoride will be used to treat and recycle depleted uranium hexafluoride.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. UNITED STATES ENRICHMENT CORPORATION

4. Plan.-- The Secretary of Energy shall prepare, and the President shall include in the budget request for fiscal year 2000, a plan and proposed legislation to ensure that all amounts accrued on the books of the United States Enrichment Corporation for the disposition of depleted uranium hexafluoride will be used to commence construction of, not later than January 31, 2004, and to operate, an onsite facility at each of the gaseous diffusion plants at Paducah, Kentucky, and Portsmouth, Ohio, to treat and recycle depleted uranium hexafluoride consistent with the National Environmental Policy Act.
- (b) Limitation.-- Notwithstanding the privatization of the United States Enrichment Corporation and notwithstanding any other provision of law (including the repeal of chapters 22 through 26 of the Atomic Energy Act of 1954 (42 U.S.C. 2297 et seq.) made by section 3116(a)(1) of the United States Enrichment Corporation Privatization Act (104 Stat. 1321-349), no amounts described in subsection (a) shall be withdrawn from the United States Enrichment Corporation Fund established by section 1308 of the Atomic Energy Act of 1954 (42 U.S.C. 2297b-7) or the Working Capital Account established under section 1316 of the Atomic Energy Act of 1954 (42 U.S.C. 2297b-15) until the date that is 1 year after the date on which the President submits to Congress the budget request for fiscal year 2000.
- (c) Sense of the Senate.--It is the sense of the Senate that Congress should authorize appropriations during fiscal year 2000 in an amount sufficient to fully fund the plan described in subsection (a).

Approved July 21, 1998.

Appendix B

Request for Expressions of Interest for an Depleted Uranium Hexafluoride Integrated Solution Conversion Contract and Near-Term Demonstrations

The U.S. Department of Energy through its Office of Nuclear Energy, Science and Technology is seeking expressions of interest (EOI) on the disposition of the Department's depleted uranium hexafluoride (DUF₆) inventory. The Department's objective is an integrated solution to eliminate or reduce the long-term liability, including potential environmental and safety concerns, to the Federal government for up-keep of the DUF₆ inventory. The Department will soon issue a final *Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride* followed by a Record of Decision. This EOI request will likely provide information to implement the Department's preferred alternative, if selected in the Record of Decision, and formulate a viable procurement strategy for an integrated solution.

One of the most important policy statements made by the Government with regard to DUF₆ has been Public Law 105-204, signed by the President in July 1998. This law directed the Secretary of Energy to prepare and submit a plan to ensure that all funds accrued on the books of the United States Enrichment Corporation (USEC) for the disposition of DUF₆ will be used for the construction and operation of plants at Paducah and Portsmouth to treat and recycle the DUF₆, consistent with the National Environmental Policy Act (NEPA). The Law also stipulates that the plan should be structured for construction of the plants to begin by January 31, 2004.

"Treat and recycle," in this context, refers to the chemical processing of DUF₆ to remove the fluorine and create products that would present both a lower long-term storage hazard and provide materials that would be suitable for use or disposal. Importantly, this process would also allow the private and government sectors to explore the use of the products.

The Department remains concerned about the future potential displacement of workers and economic disruptions at the Gaseous Diffusion Plants in Kentucky and Ohio in the wake of USEC privatization. The Department plans to work with the existing bargaining units for the onsite workforce, and community reuse organizations to assist in this transition. The Department is willing to commit funds to cover worker wages during training and training support to local community colleges. Many of these workers represent important experience which may be valuable to the Department's DUF₆ disposition program.

One of the most significant legacies left with the Department after the privatization of USEC is approximately 700,000 metric tons of DUF₆ stored in approximately 57,700 cylinders (37,000 are in Paducah, Kentucky, 16,000 in Portsmouth, Ohio, and 4,700 in Oak Ridge, Tennessee).

DUF₆ is a stable but toxic, granular solid, much of which has been stored for long periods. The advanced age of some of the steel cylinders in which the DUF₆ is contained has highlighted a potential and significant environmental and safety hazard. This was underscored by Defense Nuclear Safety Board Recommendation 95-1 which recommended that the Department improve storage and maintenance of the DUF₆ cylinders. While DUF₆ is not as significant a radiological threat as other isotopes, it is a chemical hazard. Since 1990, the Department has conducted a focused program of cylinder inspections, recoatings, and relocations to assure that DUF₆ is safely contained until the Department arranges for its disposition.

The Department believes that the private sector, rather than the Government, may be better able to provide solutions for the management of the Department's DUF₆ inventory. A key Departmental objective is to fully integrate all elements of managing the Department's DUF₆ inventory into a single contracting arrangement. Management of the Department's DUF₆ inventory involves the following elements: cylinder surveillance and maintenance; the design, construction, operation, and final decommissioning of conversion facilities; storage or use of conversion end products; and disposition of end products not used -- uranium and fluorine compounds and empty storage cylinders. The Department anticipates that required conversion facilities will be built, owned, and operated by the private sector.

The Department wishes to better understand the capability of the private sector to handle this significant challenge. The Department is considering a variety of activities including the construction of facilities ranging from demonstration size plants to full-scale conversion plants.

The Department solicits your organization's ideas, opinions, and interest in participating in all or part of the Department's management of the DUF₆ inventory. Information provided through this EOI request will assist the Department in determining the best procurement strategy. Responses should be structured specifically addressing the following:

1. Description of your organization, its capabilities, and its interest in the Department's DUF₆ program.
2. The feasibility of a single integrated contract approach which fully incorporates all or most of the Department's DUF₆ management elements.
3. Description of your organization's proposed approach to meet the Department's objective. Describe the process that would be used to convert the DUF₆. Identify if this process is a proprietary process and is patented or has a patent pending. If this process is patented, identify who owns the patent and any licensing information. Identify and describe if the proposed process has been demonstrated or commercially applied and at what scale. Identify any challenges and risk in applying the proposed process in a full scale production plant. Identify how your organization would minimize these risks.
4. The necessity, in terms of technological and economic considerations, of near-term

demonstration-scale facilities at Paducah and Portsmouth that will provide substantive information which benefits the overall DUF₆ Program. Include any information your organization considers relevant, but specifically address:

- the purpose of the demonstrations with analyses that such demonstrations are safe and cost-effective;
 - availability of equipment and buildings at the Paducah and Portsmouth sites that could support such demonstrations;
 - NEPA and regulatory oversight issues which would need to be addressed to conduct the demonstrations;
 - cost, schedule, safety considerations, and approximate numbers of personnel required to perform the demonstrations -- including the decontamination and decommissioning (D&D) of the demonstrations;
 - transition to full-scale production.
5. Recommendations regarding the characteristics that should be reflected in full-scale plants. Include any information your organization considers relevant, but specifically address:
- product forms, throughput, waste streams, process chemical requirements, and general plant utility and other support requirements;
 - modularity of facility design -- including advantages and disadvantages of modular approach;
 - availability of existing plant designs, equipment, and buildings that could help accelerate the construction of full-scale plants at the Paducah and Portsmouth sites;
 - NEPA and regulatory oversight issues which would need to be addressed to construct and operate the conversion plants;
 - cost, schedule, safety considerations, and approximate numbers of personnel required to construct and operate full-scale plants -- including the eventual D&D of the conversion facilities.
6. Innovative approaches regarding the use of government land or facilities at Paducah and Portsmouth.
7. Private sector financing, construction, ownership and operation of conversion facilities that can be used to minimize cost, and begin conversion facilities construction as soon as possible before January 2004. Identify and justify the appropriate contract type(s) for each phase of the project.
8. Government actions that are needed to ensure successful implementation of respondent's concepts for this program.

9. Potential factors that should be considered by the government in selecting the proposed approach to implement this program.
10. Beneficial use or sale of DUF_6 and DUF_6 -derived materials for restricted end-uses in commercial and Federal nuclear programs that could reduce the government's life-cycle costs for conversion, storage and disposition of the material, and innovative approaches to establish such activities.
11. The safe transportation, conversion, and disposition of approximately 4,700 DUF_6 cylinders currently stored at the Oak Ridge site.
12. The establishment of worker training programs with respect to the handling of materials and operation of the conversion facilities.

Proprietary information provided in your organization's response should be marked appropriately. This information will be held in confidence by the Department.

Send 12 copies of your responses to Thomas E. Brown, Procurement Analyst, U.S. Department of Energy, MA-52, 1000 Independence Avenue, S.W., Washington, DC 20585 no later than April 5, 1999. Before submitting questions regarding this EOI, please review the "*frequently asked questions*" section on this web page.